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Product Specification

IEEE 802.11b/g/n 1T1R SDIO WiFi Module

Project Name	RTL8189ES 11n WIFI Module
Model NO	<u>FN-8900M (F89ESSM23-W1-VIA)</u>
Customer	
Customer's Part NO	

Approved:: William Tan	Check: Jim HU	Prepared: Allen Hu
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Feedback of customer's Confirmation <p style="text-align: center;">We accept the specification after Confirmed.</p>		
Customer	Customer signature	Approved Date

CONTENT

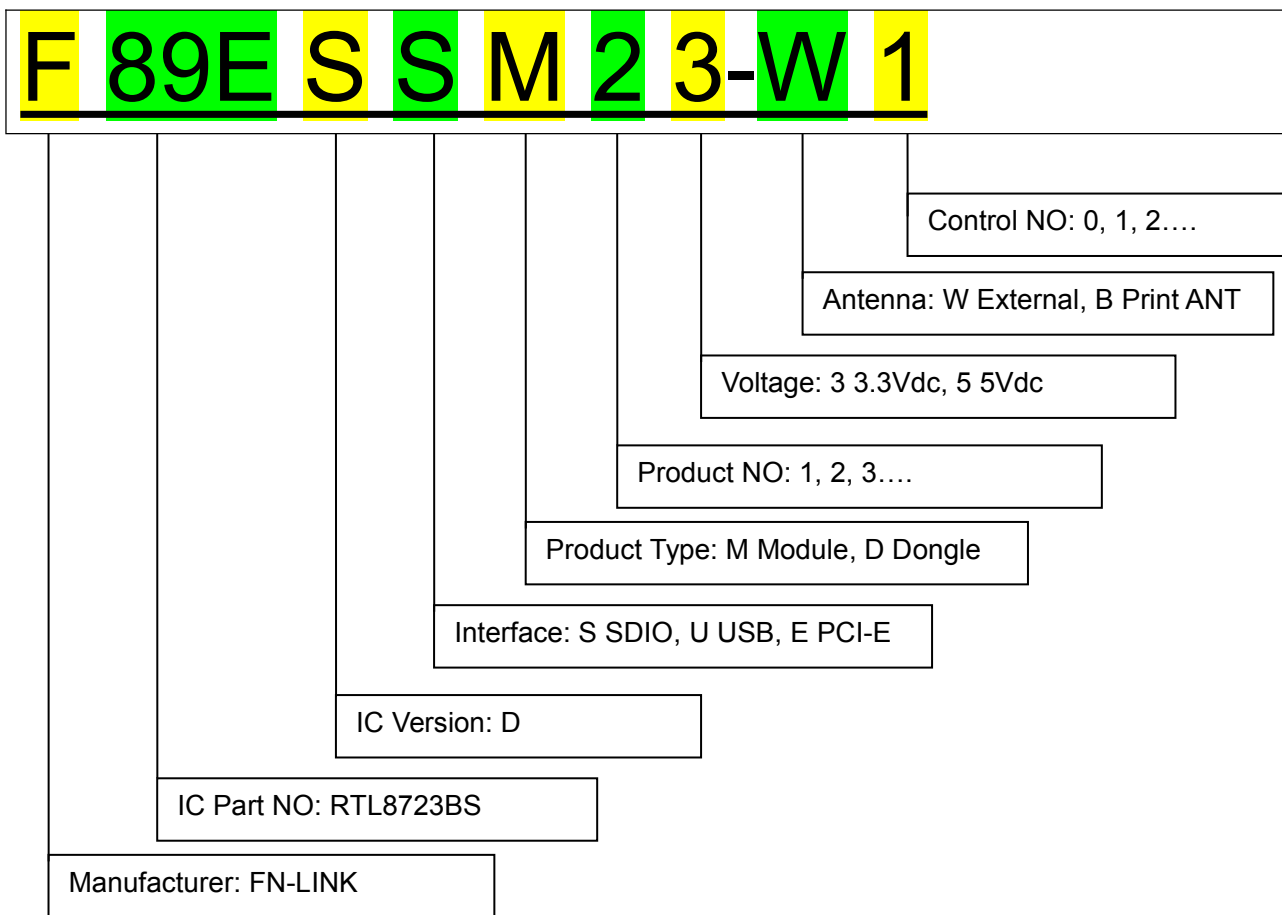
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0. Revision History

REV NO	Date	Modifications	Approved	Drafted
Rev1.0	Jul 16,2015			Allen Hu
Rev1.2	May.25,2018	Added tolerance	HJ	Jacky

0.1. Model No Definition

Example: F89ESSM23-W1



1. Introduction

F89ESSM23-W1-VIA is a highly integrated and excellent performance Wireless LAN (WLAN) SDIO network interface device. High-speed wireless connection up to 150 Mbps .

1.1 Overview

The general hardware for the module is shown in Figure 1. This WLAN Module design is based on Realtek RTL8189ES. It is a highly integrated single-chip 1*1 MIMO (Multiple In Multiple Out) Wireless LAN (WLAN) SDIO network interface controller complying with the 802.11n specification. It combines a MAC, a 1T1R capable baseband, and RF in a single chip. It is designed to provide excellent performance with low power Consumption and enhance the advantages of robust system and cost-effective.

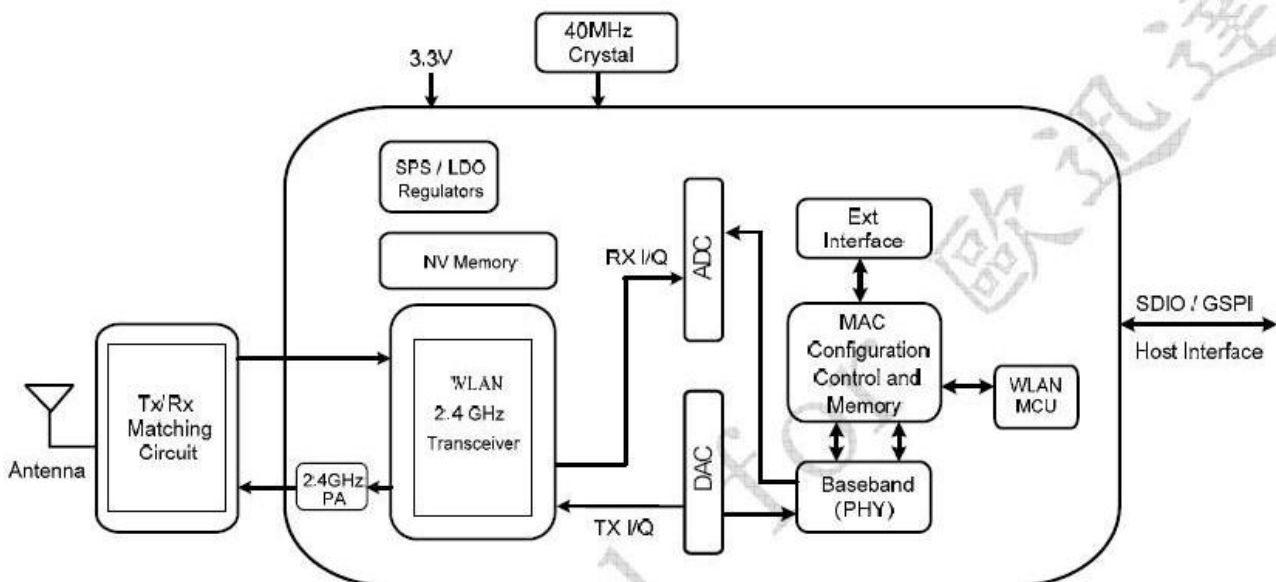


Figure 1: Single-brand 11n (1*1) solution

1.2 Specification Reference

This specification is based on additional references listed as below.

- iIEEE 802.11b
- iIEEE 802.11g
- iIEEE 802.11n

2. GENERAL SPECIFICATION

2.1 WiFi RF Specifications

Features	Descriptions
Main Chipset	Realtek RTL8189ES
Operating Frequency	2.400~2.4835GHz
Operating Voltage	3.3Vdc \pm 10% I/O supply voltage
Host Interface	SDIO/GSPI
WiFi Standard	WiFi: IEEE 802.11b, IEEE 802.11g, IEEE 802.11n,
Modulation	WiFi: 802.11b: CCK(11, 5.5Mbps), QPSK(2Mbps), BPSK(1Mbps), 802.11 g/n: OFDM
PHY Data rates	WiFi: 802.11b: 11,5.5,2,1 Mbps 802.11g: 54,48,36,24,18,12,9,6 Mbps 802.11n: up to 150Mbps
Transmit Output Power	WiFi: 802.11b@11Mbps 15 \pm 1.5dBm 802.11g@6Mbps 14 \pm 1.5dBm 802.11g@54Mbps 14 \pm 1.5dBm 802.11n@65Mbps 13 \pm 1.5dBm (MCS 0_HT20) 13 \pm 1.5dBm (MCS 7_HT20) 13 \pm 1.5dBm (MCS 0_HT40) 13 \pm 1.5dBm (MCS 7_HT40)
EVM	802.11b /11Mbps : EVM \leq -9dB 802.11g /54Mbps : EVM \leq -25dB 802.11n /65Mbps : EVM \leq -28dB
Receiver Sensitivity (HT 20)	802.11b@8% PER 1Mbps -88 \pm 1dBm 2Mbps -87 \pm 1dBm 5.5Mbps -85 \pm 1dBm 11Mbps -82 \pm 1dBm 802.11g@10% PER 6Mbps -86 \pm 1dBm 9Mbps -85 \pm 1dBm 12Mbps -84 \pm 1dBm 18Mbps -82 \pm 1dBm 24Mbps -80 \pm 1dBm 36Mbps -77 \pm 1dBm 48Mbps -73 \pm 1dBm 54Mbps -71 \pm 1dBm 802.11n@10% PER MCS 0 -83 \pm 1dBm MCS 1 -82 \pm 1dBm MCS 2 -80 \pm 1dBm MCS 3 -78 \pm 1dBm MCS 4 -75 \pm 1dBm MCS 5 -71 \pm 1dBm MCS 6 -69 \pm 1dBm MCS 7 -67 \pm 1dBm
Operating Channel	WiFi 2.4GHz: 11: (Ch. 1-11) – United States(North America) 13: (Ch. 1-13) – Europe 14: (Ch. 1-14) – Japan
Media Access Control	WiFi: CSMA/CA with ACK

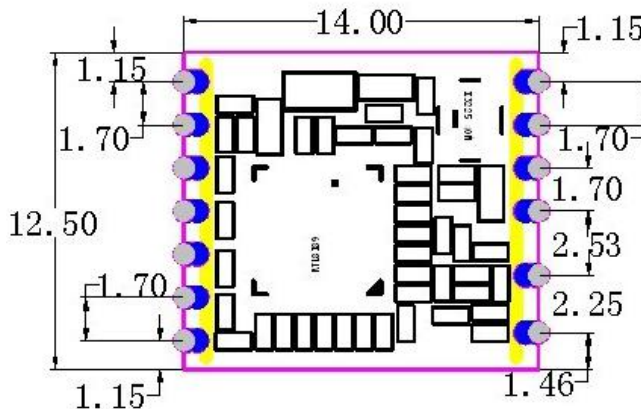
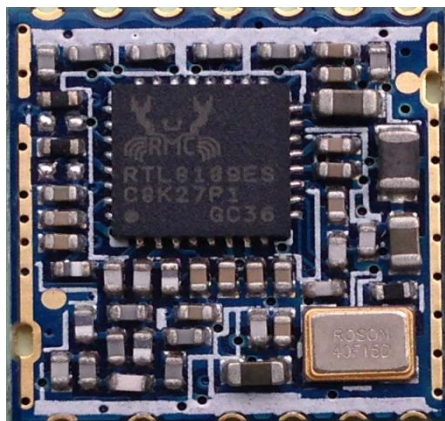
Network Architecture	WiFi: Ad-hoc mode (Peer-to-Peer) Infrastructure mode Software AP WiFi Direct
Security	WiFi: WPA, WPA-PSK, WPA2, WPA2-PSK, WEP 64bit & 128bit,
Antenna	External
OS Supported	Android /Linux/ Win CE /iOS /XP/WIN7
Dimension	Typical L14.00*W12.50*T2.00mm

2.2 Power Consumption

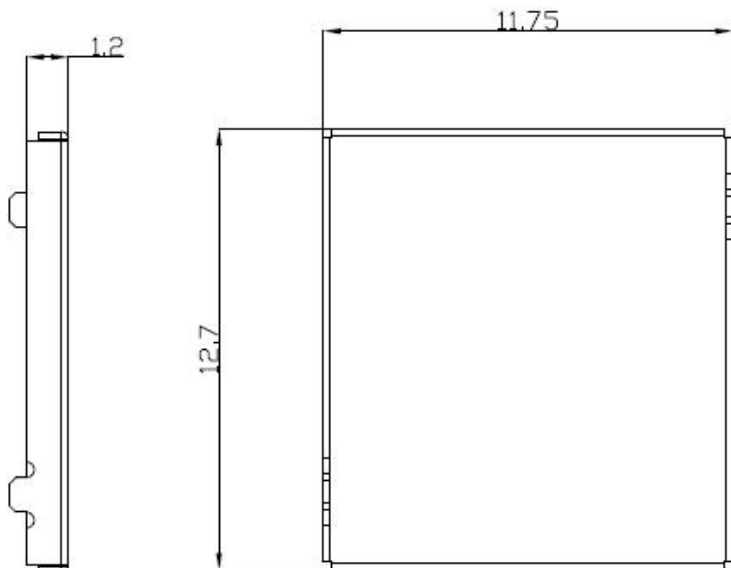
Mode	Status	Power(mW)	Note
OS Windows XP	Link	3.3Vx70mA =231	20M
		3.3Vx75 mA =248	40M
	RX	3.3Vx75mA =248	20M
		3.3Vx75 mA =248	40M
	TX	3.3Vx100 mA =330	20M
		3.3Vx110 mA=363	40M
	Power save mode	3.3Vx20 mA =66	DTIM=100ms
	Device Disable	3.3Vx25 mA =82.5	
Radio Off	3.3Vx0 mA =0		

3. Mechanical Specification

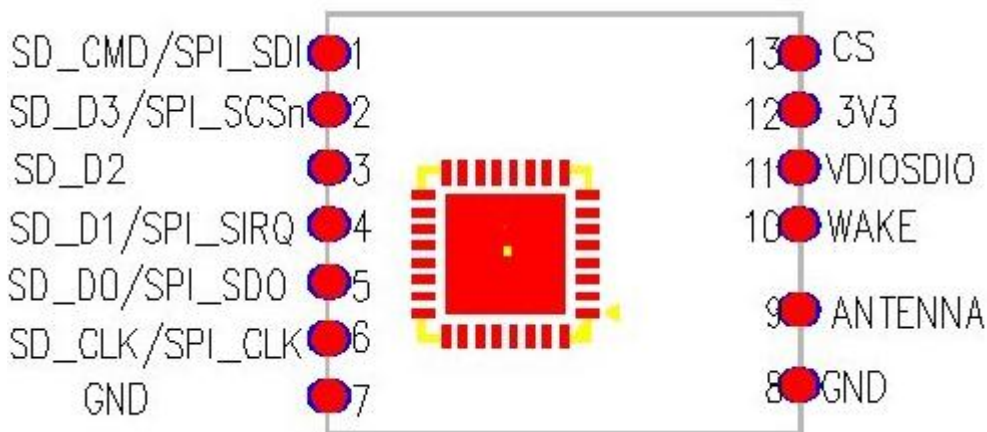
3.1 Outline Drawing (unit: ±0.15mm)



3.2 Specification of shielding case (unit: mm)

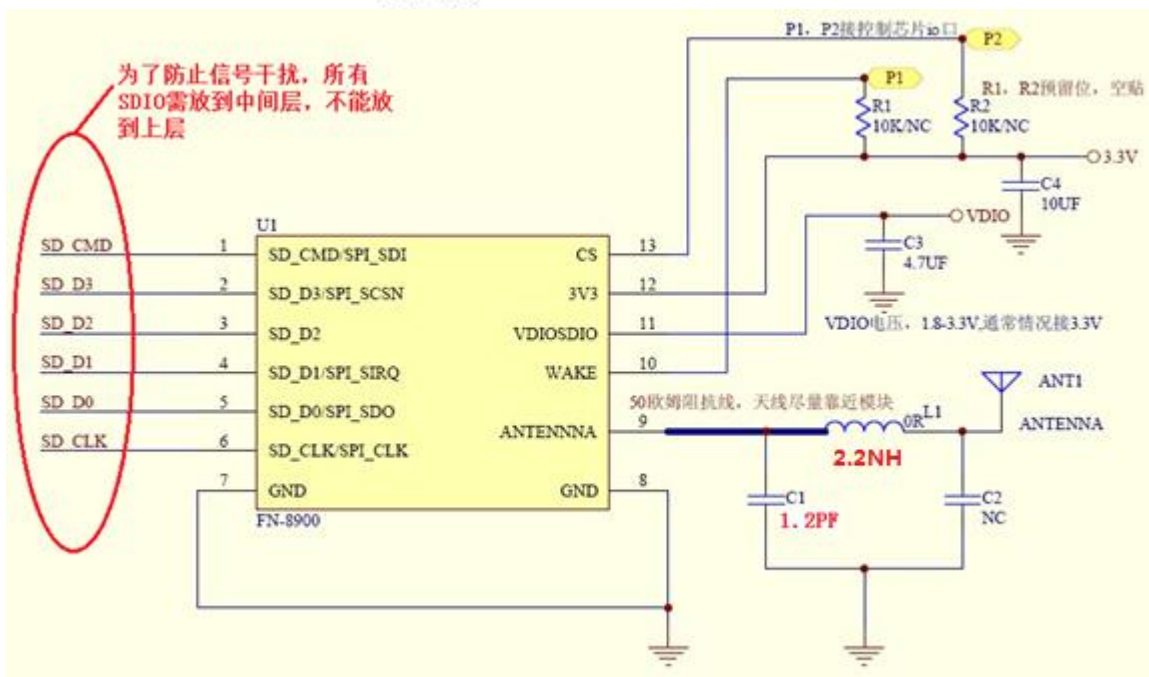
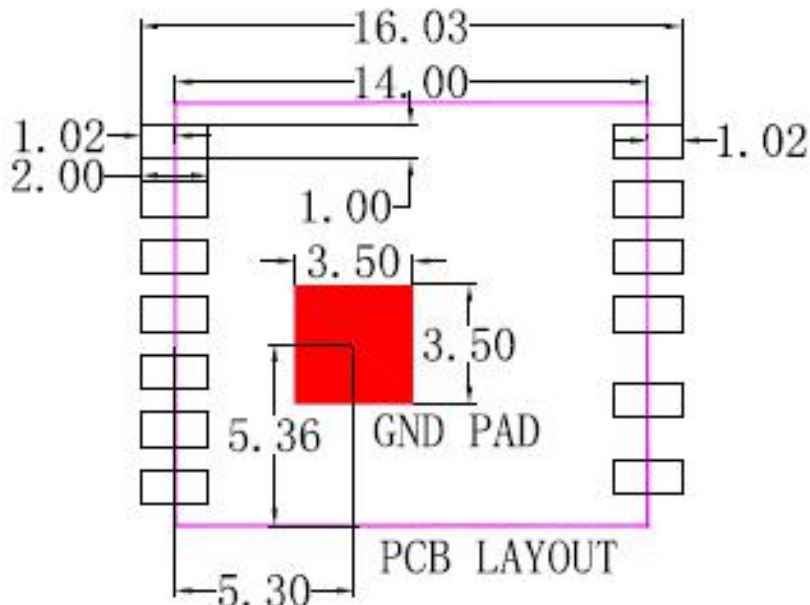


3.3 Connector Pin Definition



Pin #	Name	Description
1	SD_CMD	SDIO Command Input
2	SD_D3	SDIO Data Line 3
3	SD_D2	SDIO Data Line 2
4	SD_D1	SDIO Data Line 1
5	SD_D0	SDIO Data Line 0
6	SD_CLK	SDIO Clock Input
7	GND	POWER GND
8	GND	POWER GND
9	ANTENNA	RF OUT
10	WAKE	Wake Function
11	VDIOSDIO	SDIO Voltage 1.8V-3.3V
12	3.3	Power Supply
13	CS	PDn

3.4 Layout reference



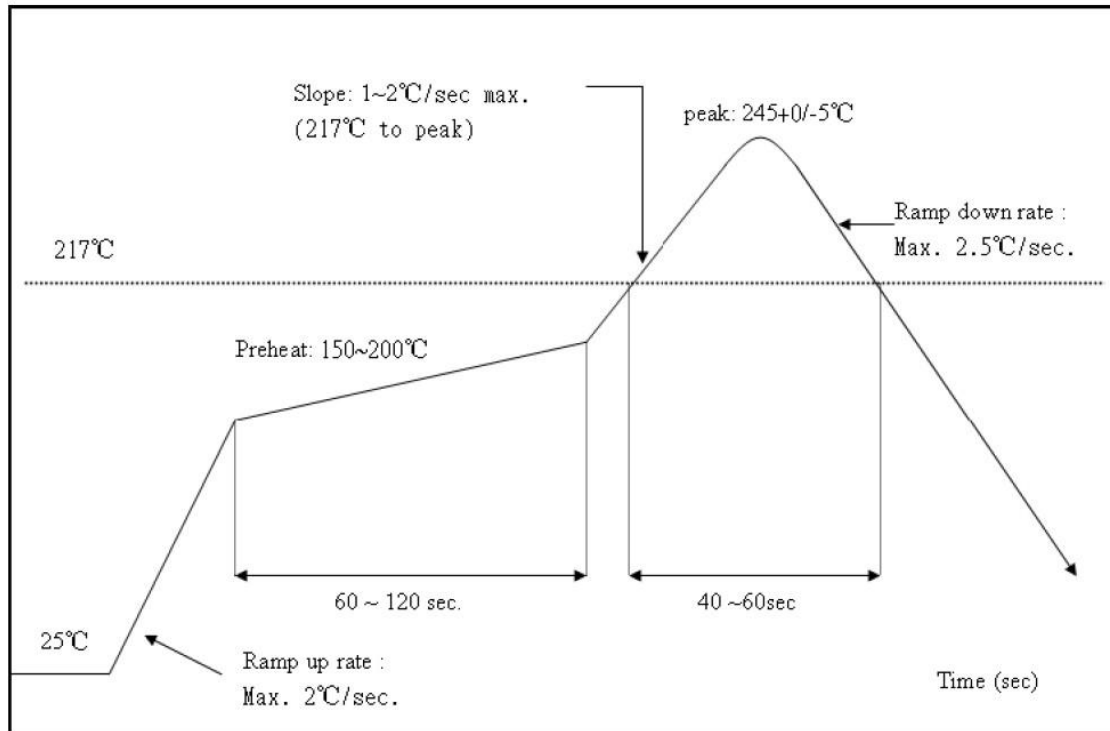
4. Environmental Requirements

4.1 Operating & Storage Conditions

Operating	Temperature: 0°C to +55°C
	Relative Humidity: 10-90% (non-condensing)
Storage	Temperature: -40°C to +80°C (non-operating)
	Relative Humidity: 5-90% (non-condensing)
MTBF (Mean Time Between Failures)	Over 150,000hours

4.2 Recommended Reflow Profile

Referred to IPC/JEDEC standard.
 Peak Temperature : <250°C
 Number of Times : ≤2 times



4.3 Patch WIFI modules installed before the notice:

WIFI module installed note:

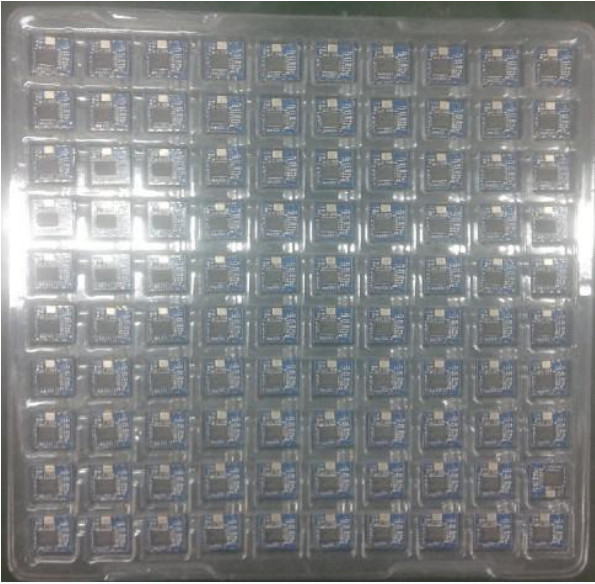
1. Please press 1 : 1 and then expand outward proportion to 0.7 mm, 0.12 mm thickness When open a stencil
2. Take and use the WIFI module, please insure the electrostatic protective measures.
3. Reflow soldering temperature should be according to the customer the main size of the products, such as the temperature set at 250 + 5 °C for the MID motherboard.

About the module packaging, storage and use of matters needing attention are as follows:

1. The module of the reel and storage life of vacuum packing: 1). Shelf life: 8 months, storage environment conditions: temperature in: < 40 °C, relative humidity: < 90% r.h.
2. The module vacuum packing once opened, time limit of the assembly: Card: 1) check the humidity display value should be less than 30% (in blue), such as: 30% ~ 40% (pink), or greater than 40% (red) the module have been moisture absorption. 2.) factory environmental temperature humidity control: ≤ -30 °C, ≤ 60 % r.h.. 3). Once opened, the workshop the preservation of life for 168 hours.
3. Once opened, such as when not used up within 168 hours: 1). The module must be again to remove the module moisture absorption. 2). The baking temperature: 125 °C, 8 hours. 3). After baking, put the right amount of desiccant to seal packages.

5. PACKING INFORMATION

5.1 Blister packaging



A piece of 100 PCS

5.2 Coiling Packaging



A roll of 2000pcs